
# The Collaborative Targeted Assessment: Stepping Stone to Efficiency

Presented by:
Jim Grisham

# CTA Objectives

- Generate interest in energy conservation
- Identify potential savings of plant utility expenses
- Reduce NOx through energy efficiency

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# Approach

Where Am I?

- Data Collection – By Merisol
- Preliminary Analysis – By DOE
- Plant Visit – Joint

What's Happening?

- Follow Up Data Collection – By Merisol
- Final Analysis – By DOE

What Can I Do?

- Report with Recommendations – By DOE
- Implementation – By Merisol

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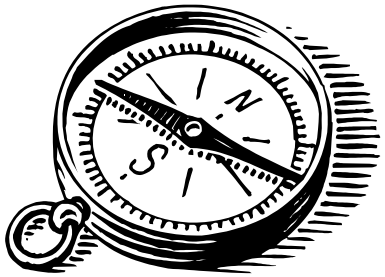
# Where Am I?



# Technical Data for Each Heater

- Number of Burners
- Burner Ratings (MMBtu/hr)
- Heater Geometry (Shell Area, Stack Height & Diameter)
- Auxiliary Equipment (Pumps, Fans, Blowers, etc.)
- Fuel Type and Heat Value

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# Operating Data for Each Heater

- Operating Hours
- Flue Gas Temperatures
- Combustion Air Temperatures
- Fuel Usage and Cost
- Flue Gas % Oxygen
- Charge Weights
- Physical Properties (Specific Heat, Heat of Vaporization)
- Charge Inlet and Outlet Temperatures
- Amount of Vaporization
- External Wall Temperature

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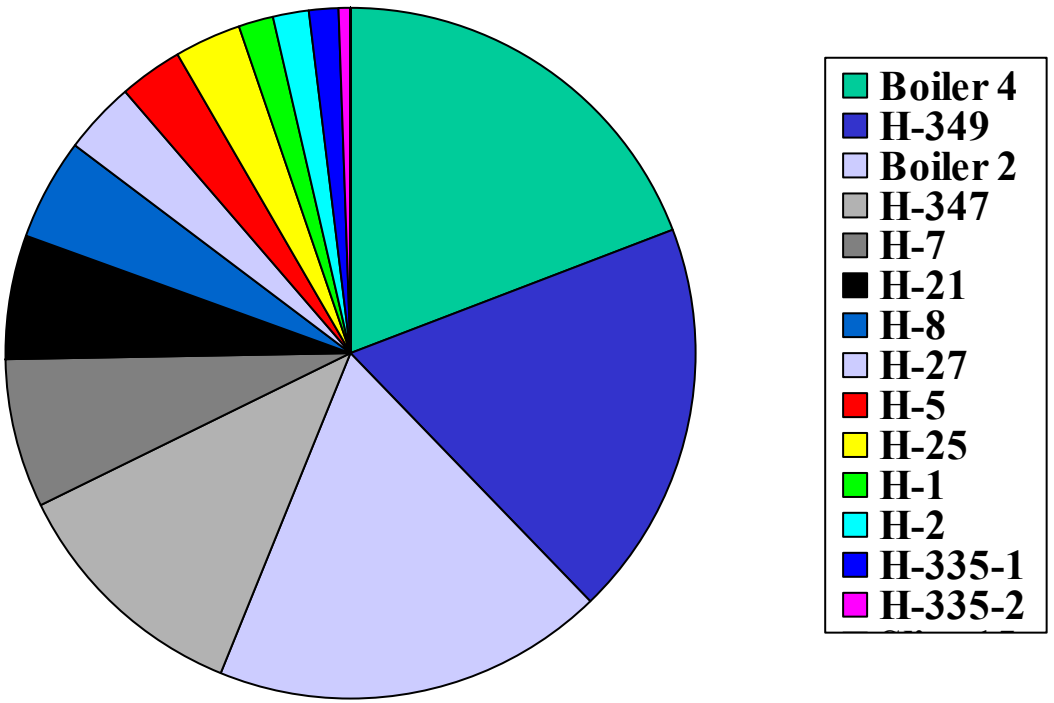
# Gas Consumed per Unit




Total Gas Consumed: 1,430,000 MMBtu/Yr

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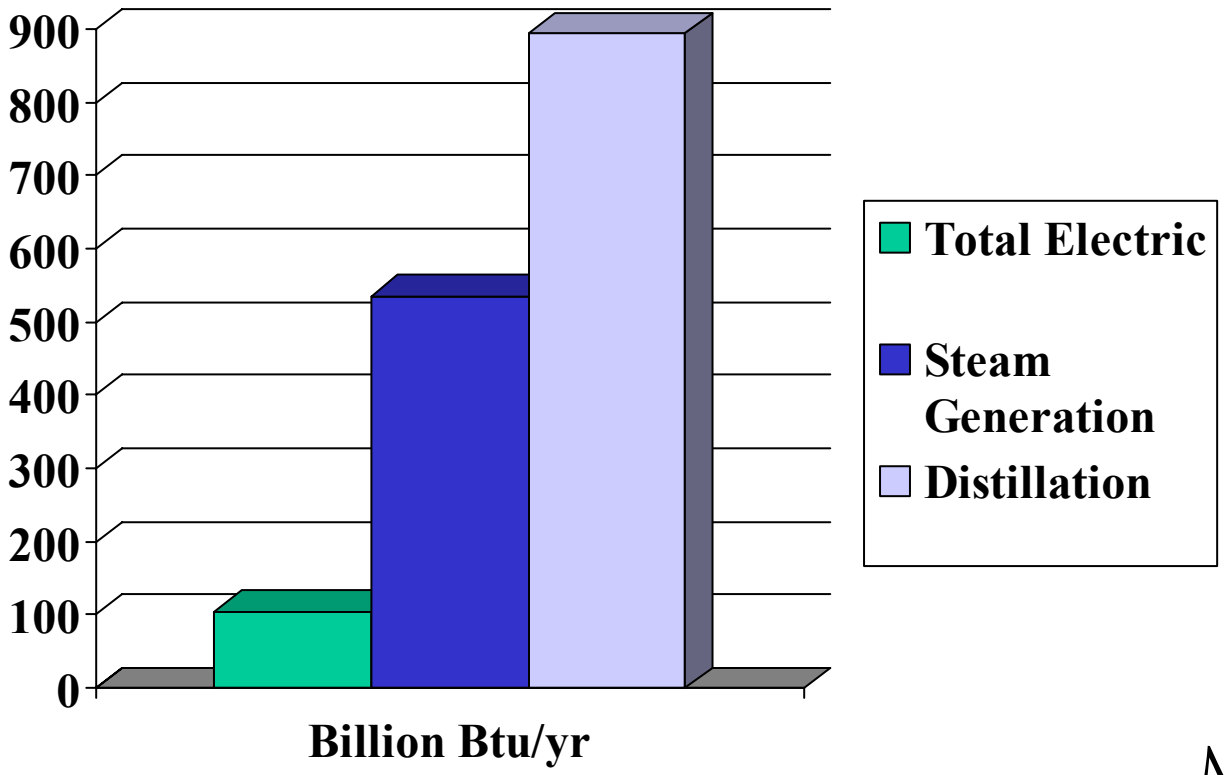
# Purchased Energy Use

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# Site Visit

- Review Data Collected
- Answer Questions / Data Needs
- Review Plant Process
- Interview Operators
- Interview Unit Engineers

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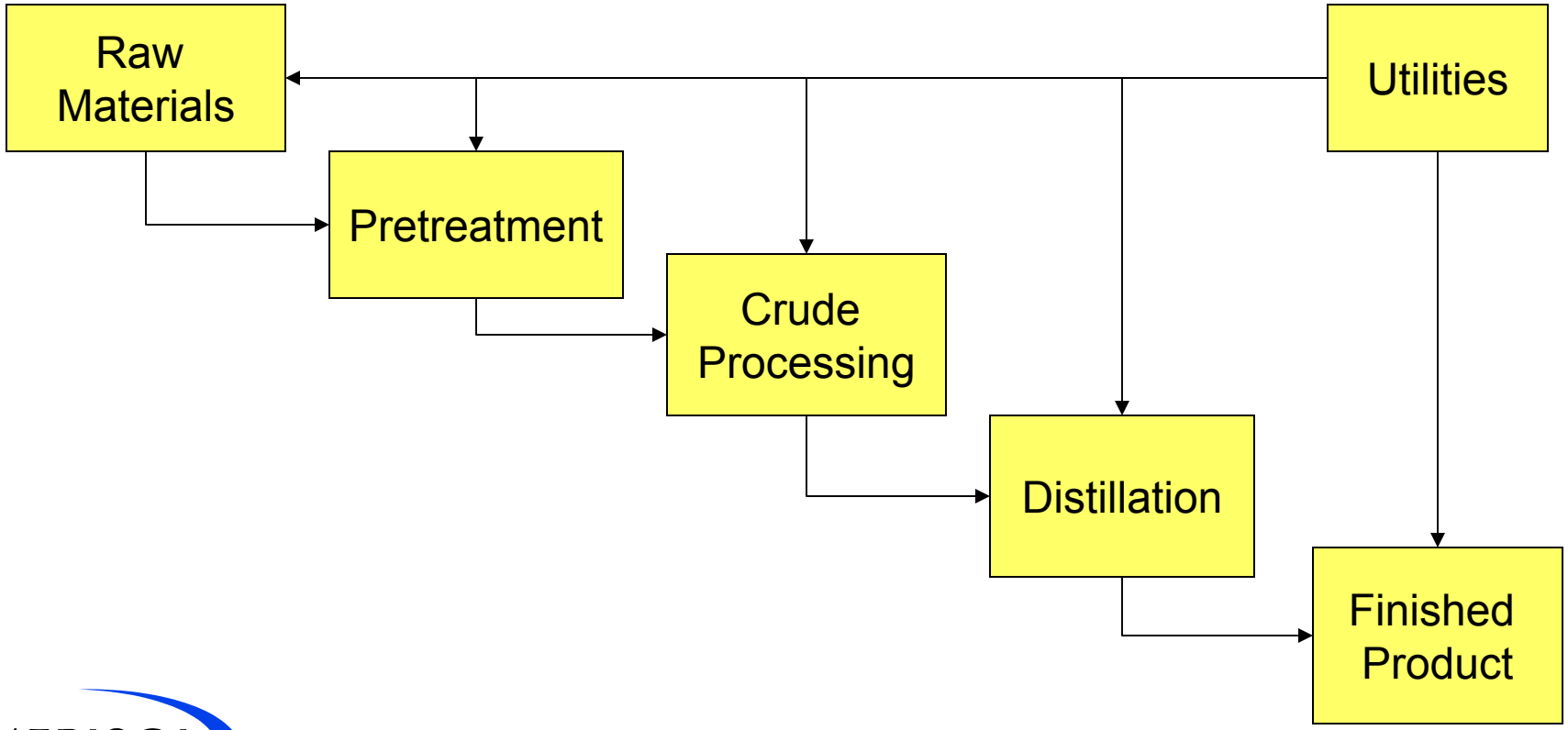
# The Process

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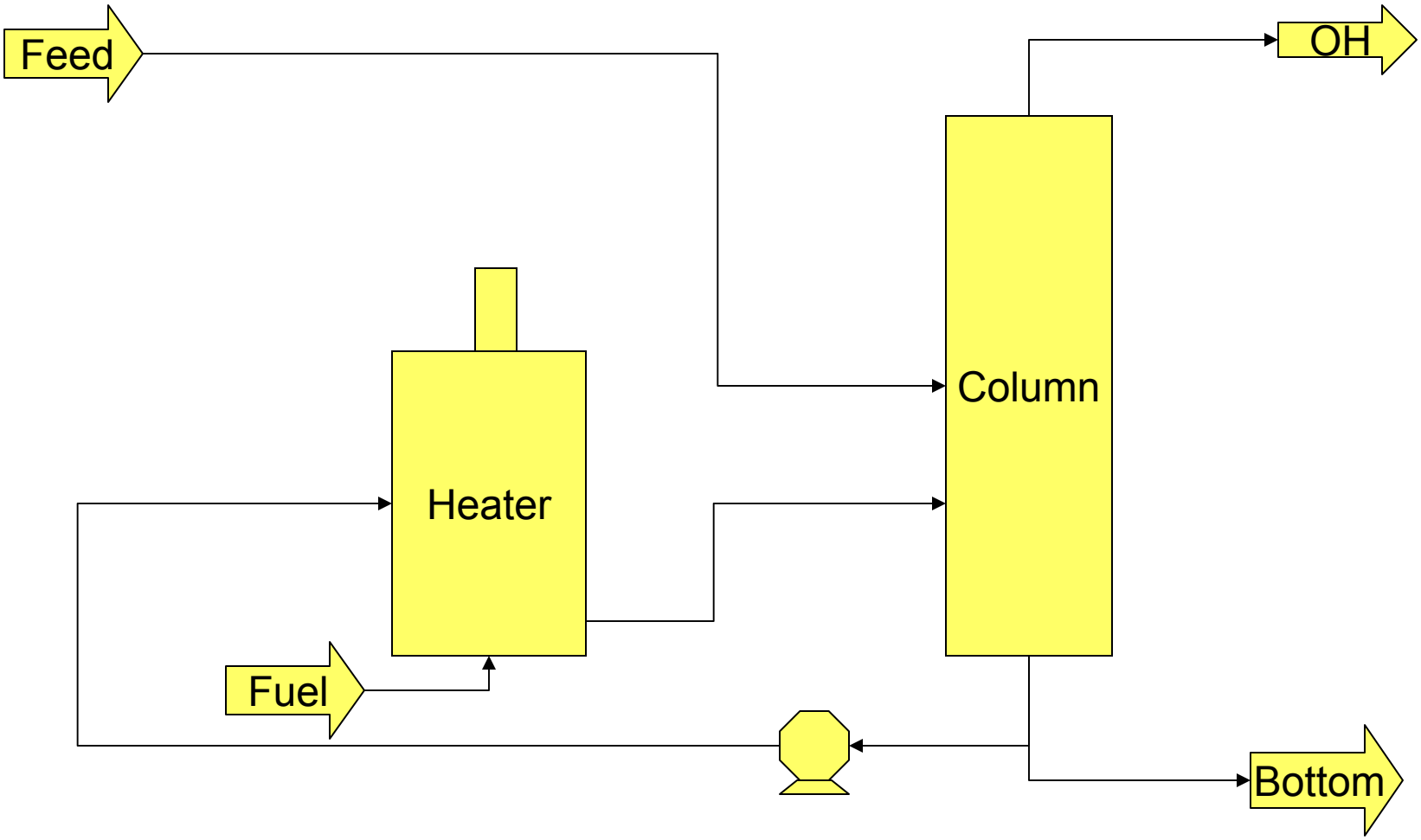
# Distillation Train (typical)



# Distillation Heat Recovery

Merisol employs heat recovery from distillation on some units including:

- Feed/Bottoms Preheaters
- Steam Generation from Overhead Product Coolers
- Combustion Air Preheater

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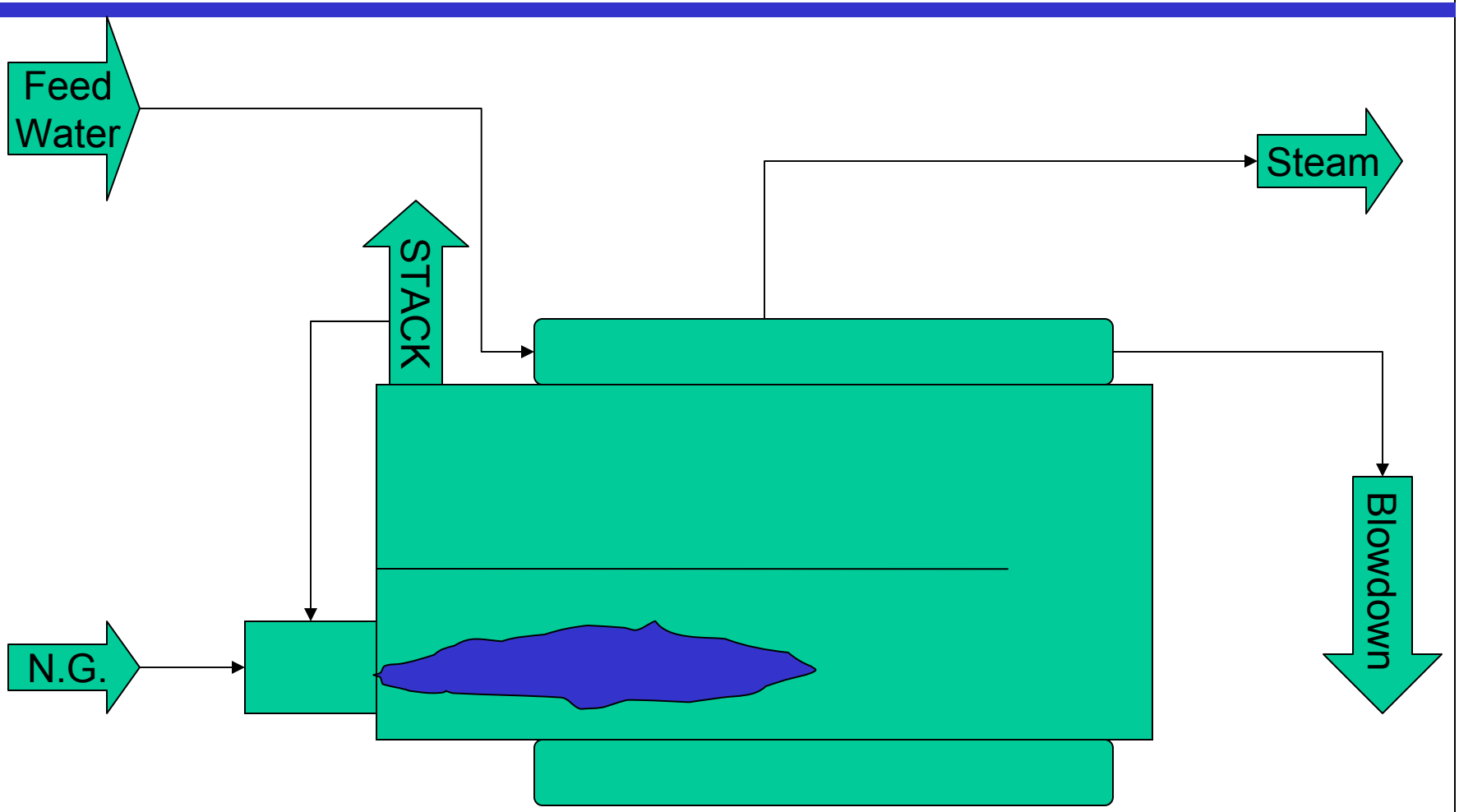
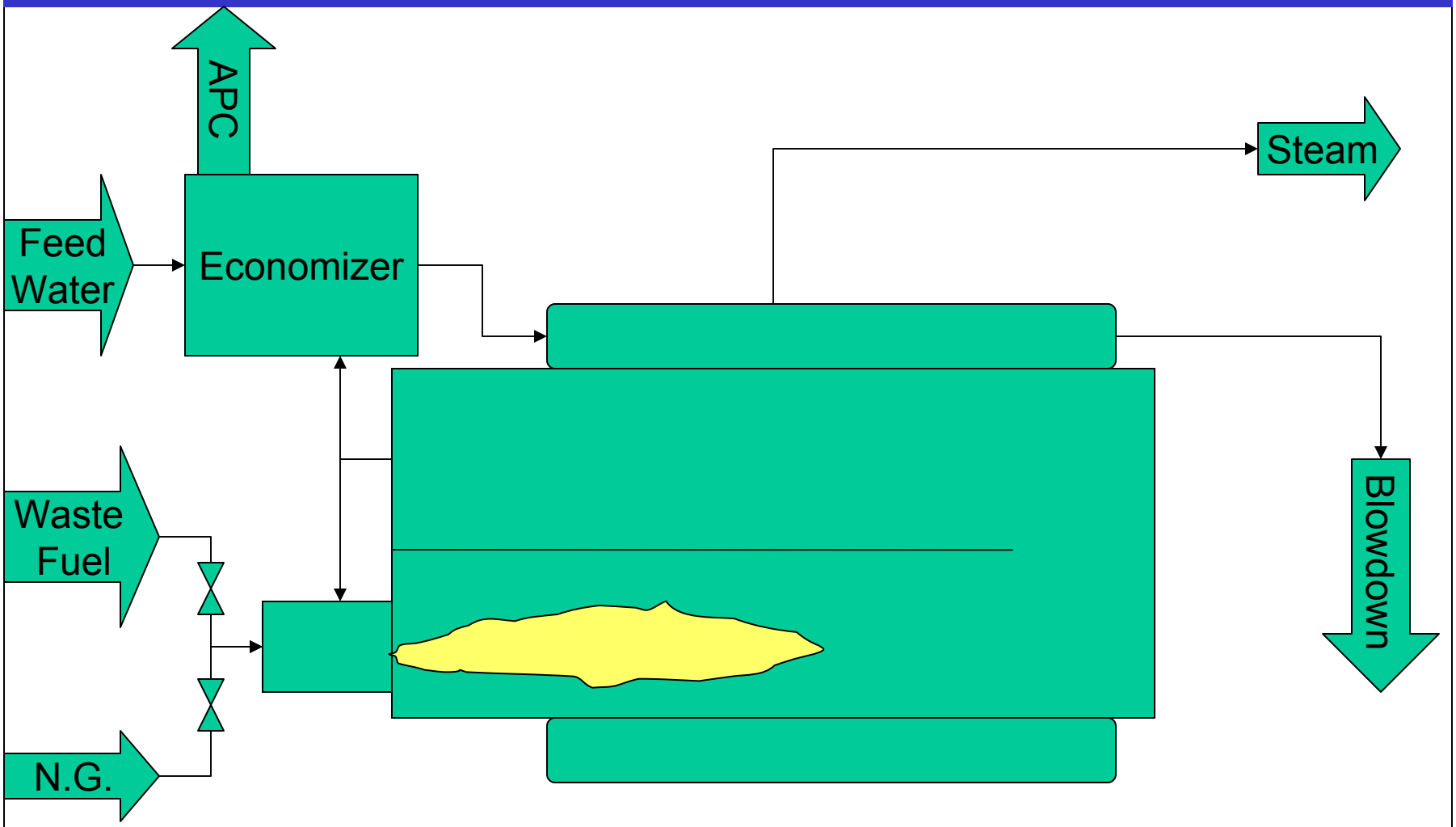
# Package Boiler (#2)



# BIF Boiler (#4)



# Boiler Heat Recovery

Merisol employs heat recovery from boilers including:

- Economizer (#4)
- Condensate Return
- Blowdown Heat Recovery (Out of Service)

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# Follow-Up Operating Data

- Charge Weights
- Physical Properties (Specific Heat, Heat of Vaporization)
- Charge Inlet and Outlet Temperatures
- Amount of Vaporization

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# What's Happening?

# Analysis

- Model Heat Balance in PHAST

(Process Heat Assessment & Survey Tool)

- Apparent Imbalance Discovered
- Need for Better Data

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# Boiler #4

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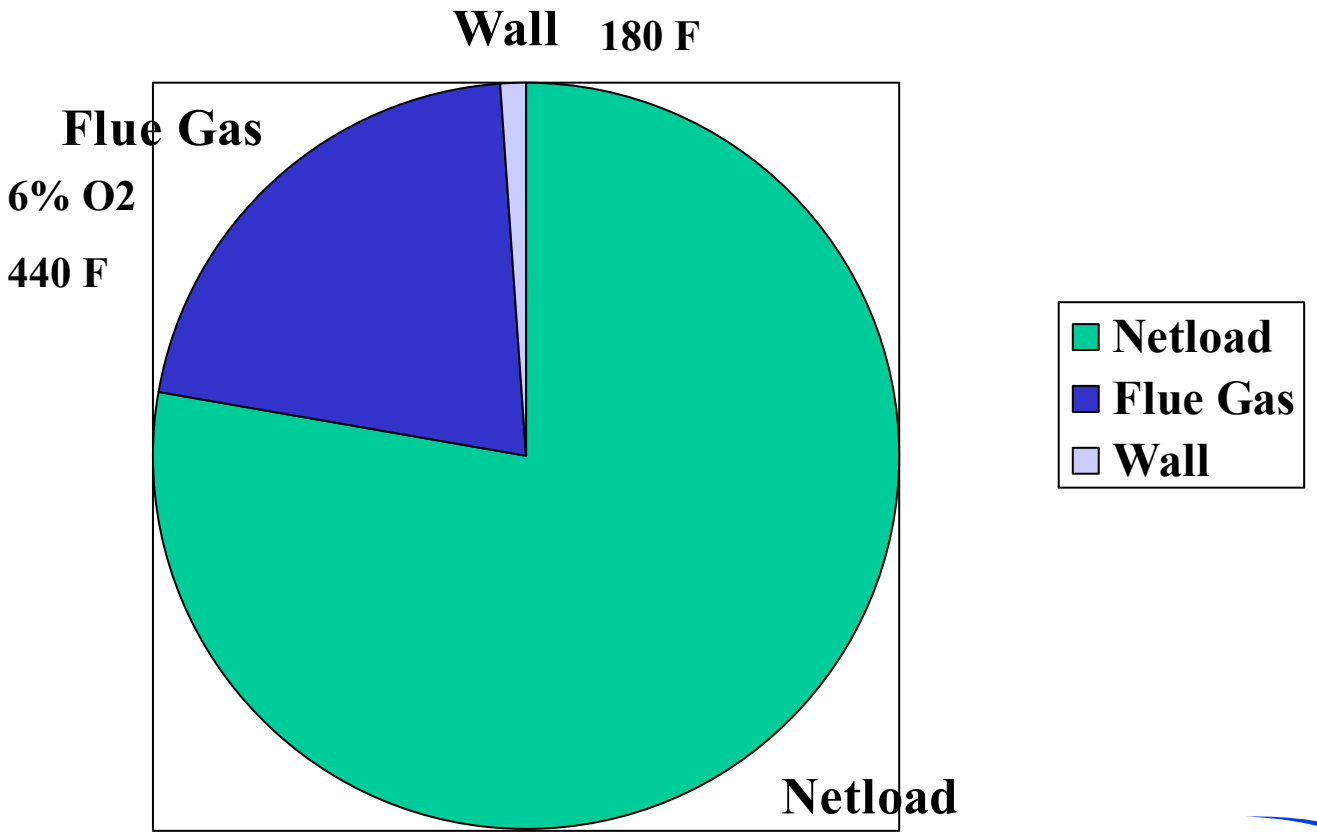
# Heat Balance Boiler #4

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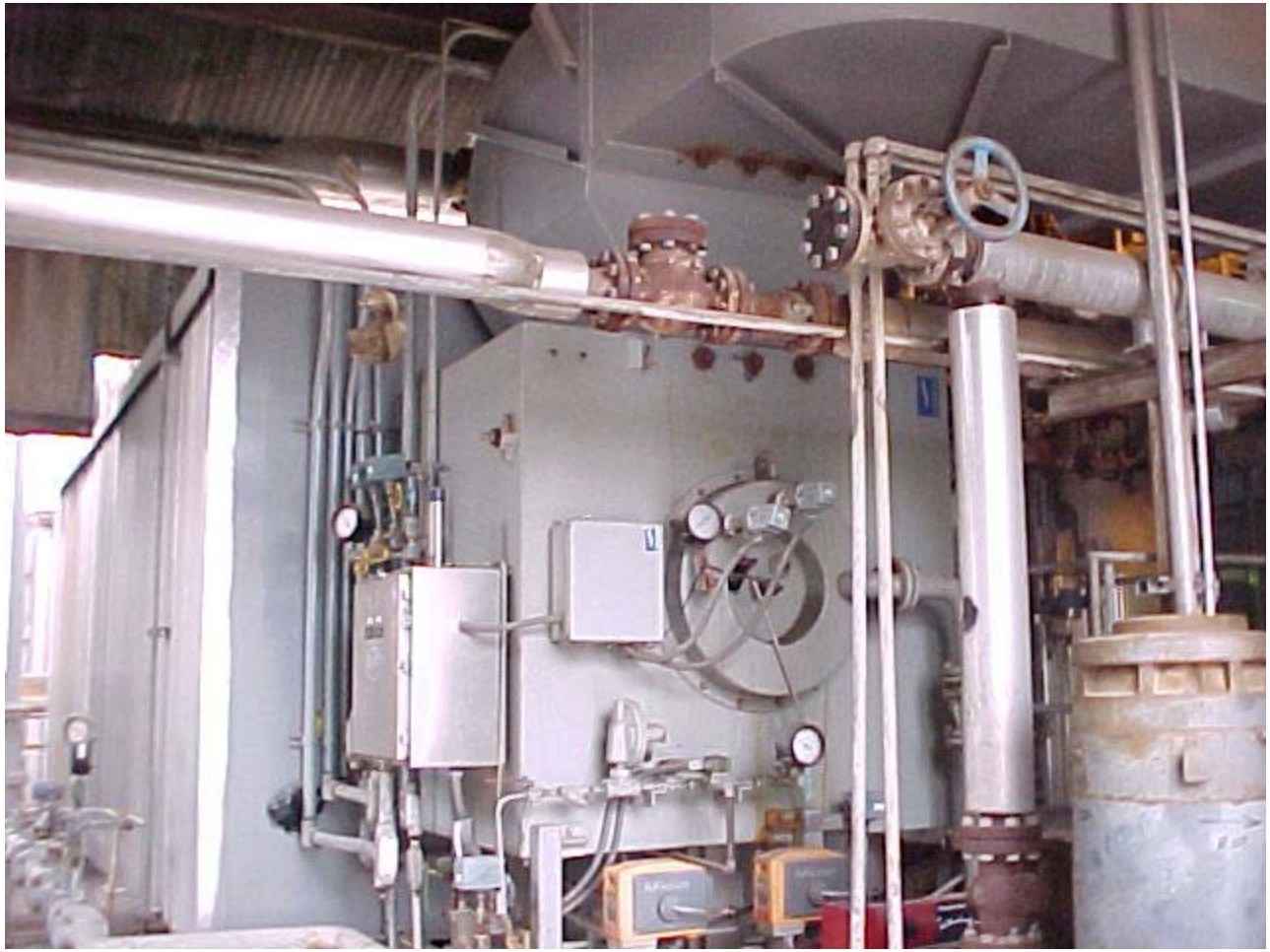
# Boiler #2



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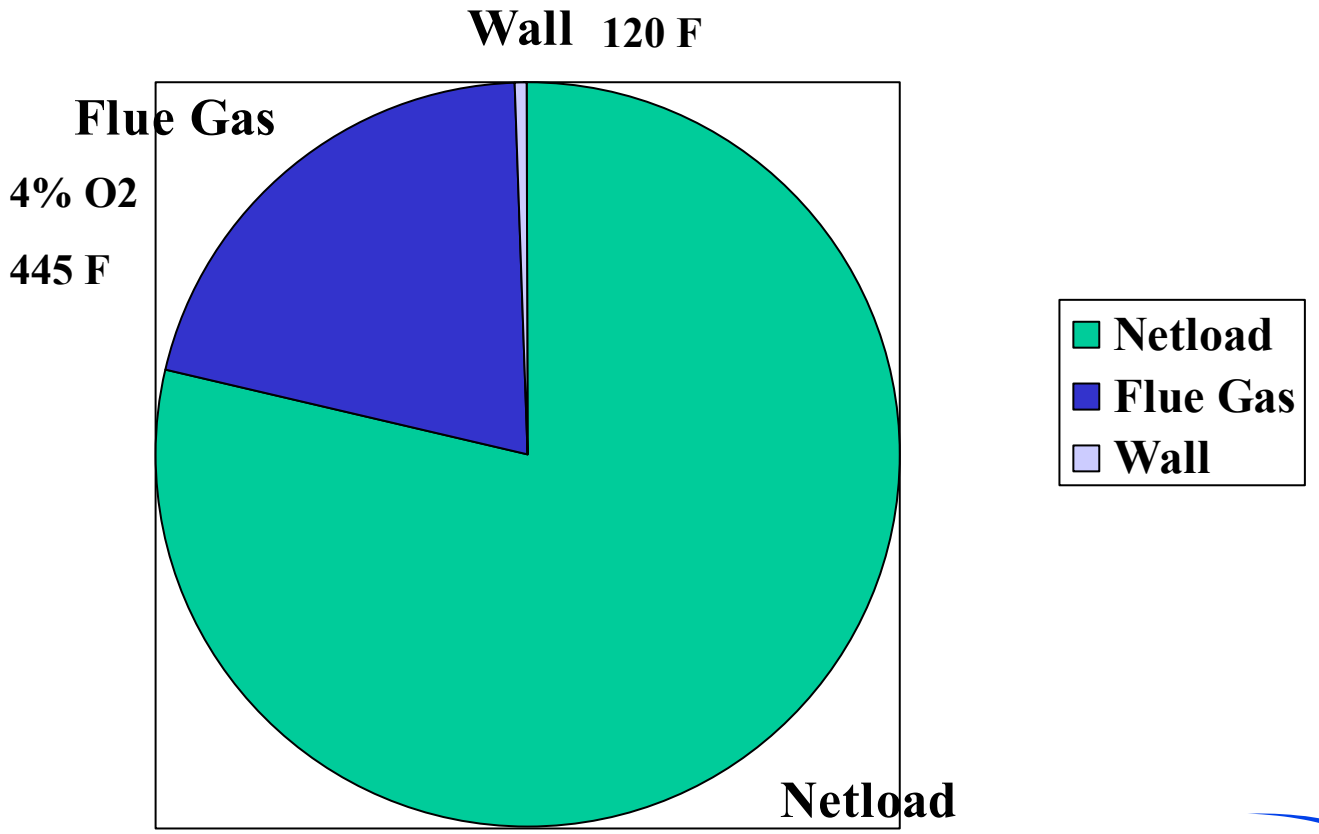
# Heat Balance Boiler #2

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# H-21

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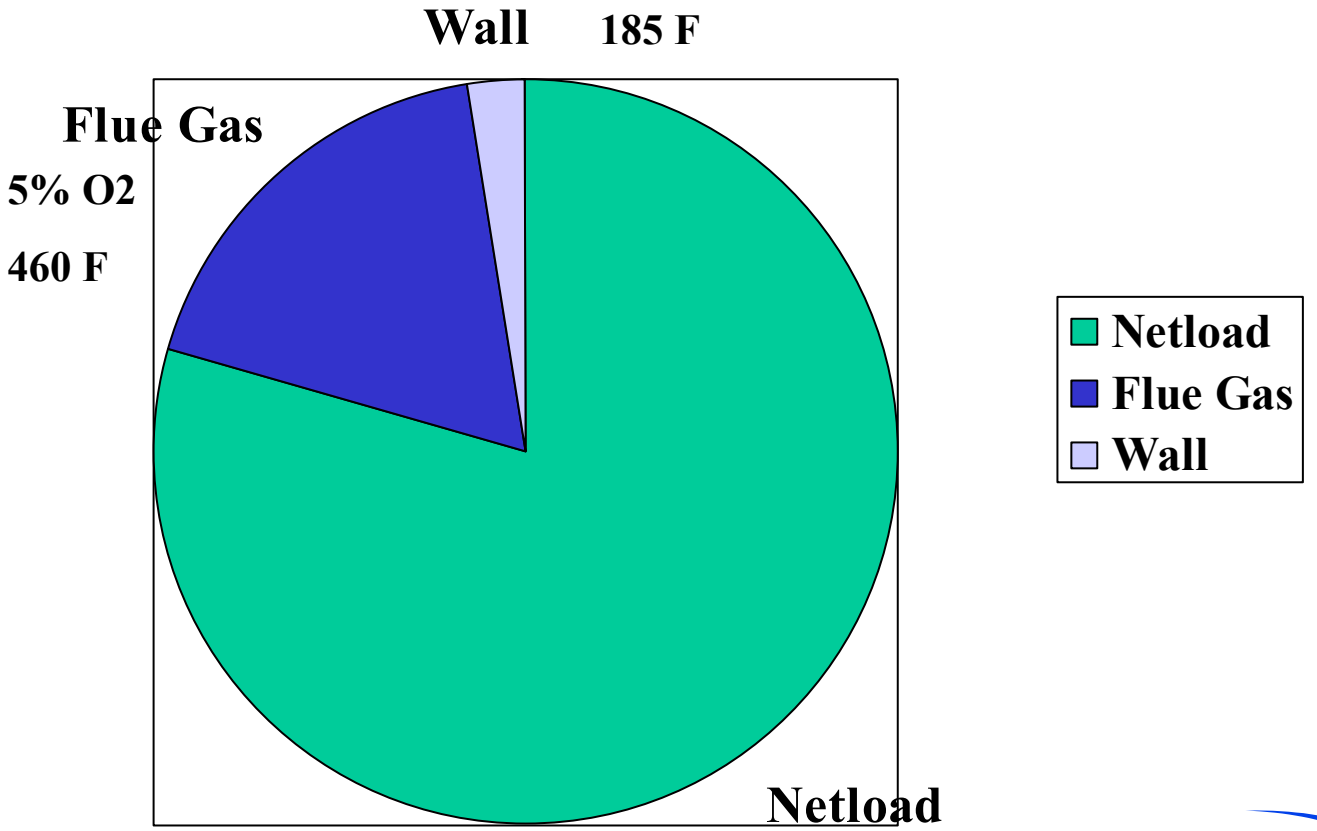
# Heat Balance H-21

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# H-349

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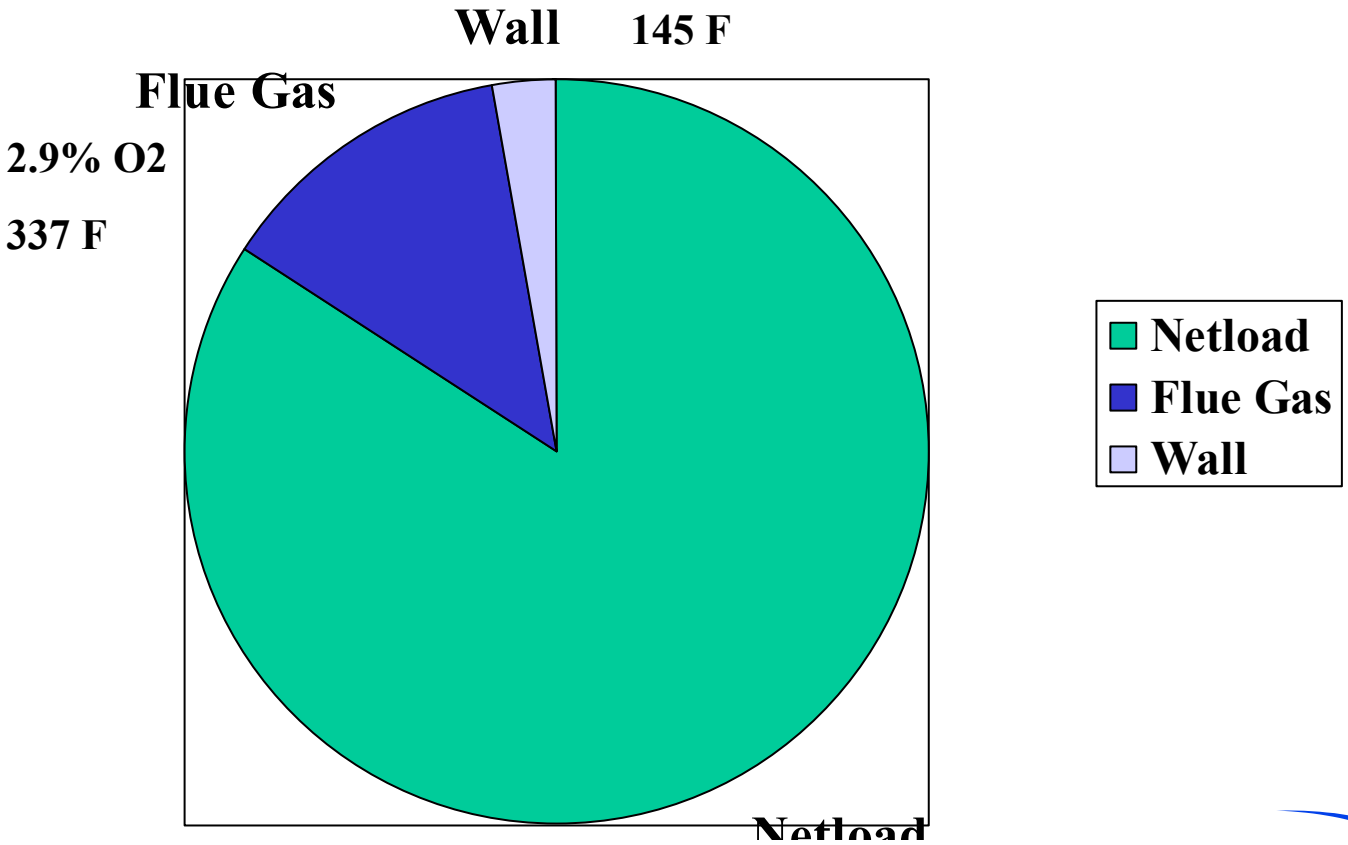
# Heat Balance H-349

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# H-347

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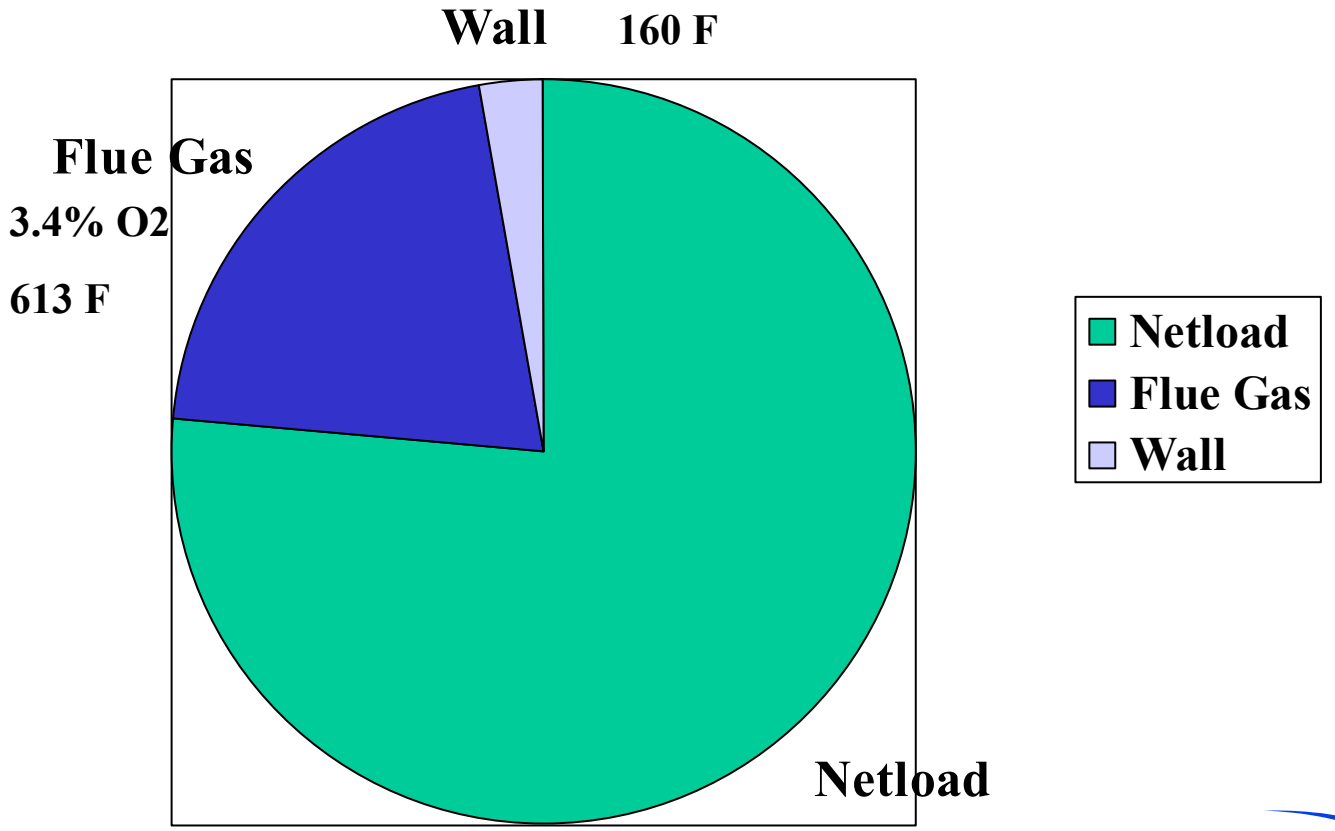
# Heat Balance H-347

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# H-7

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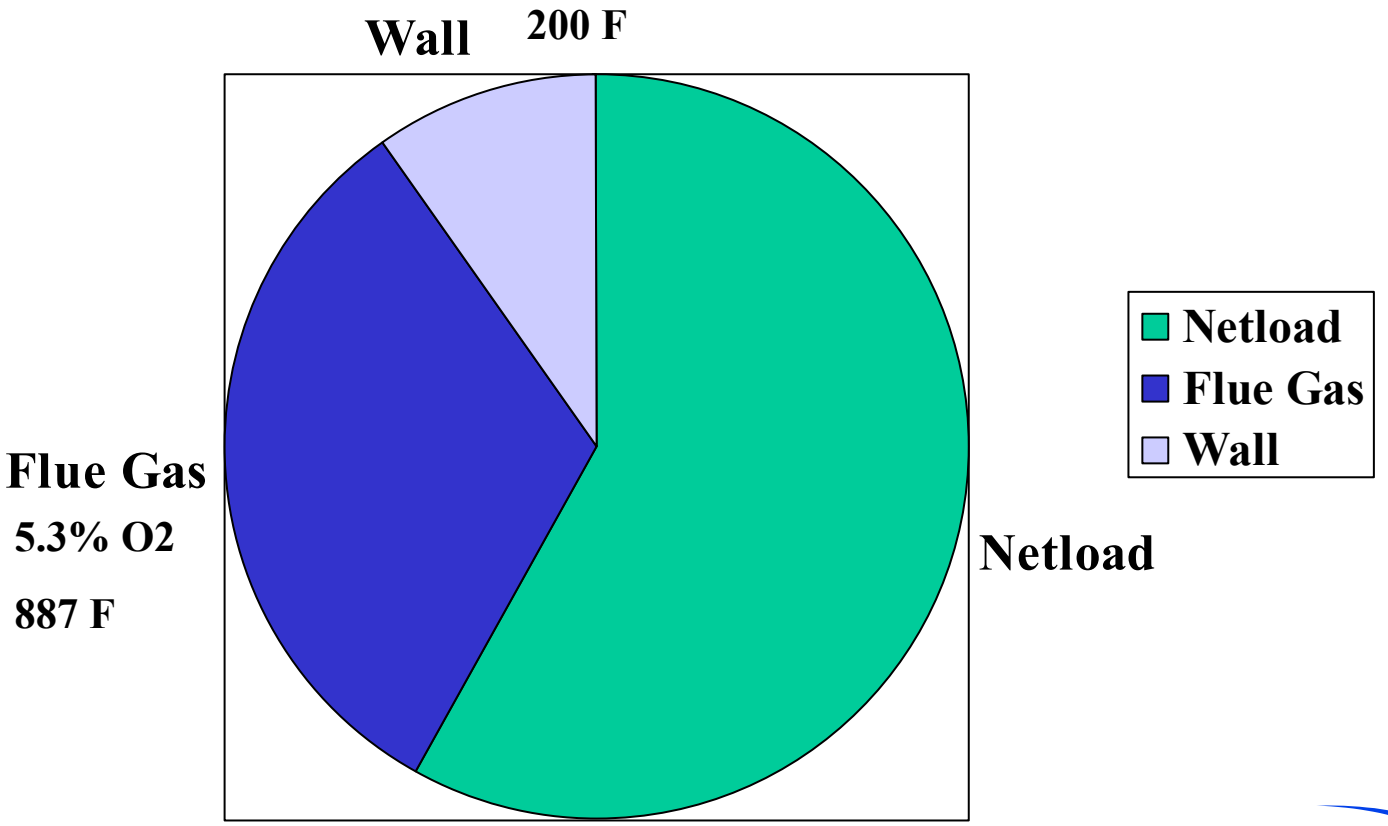
# Heat Balance H-7

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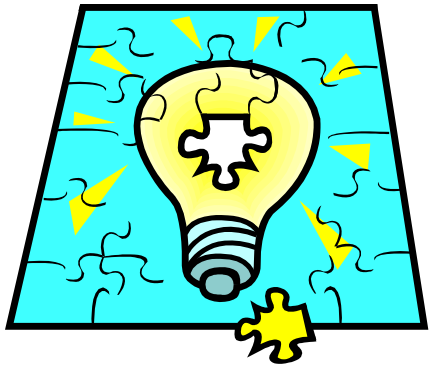
# What Can I Do?



# Recommendations

1. Oxygen Control for Flue Gas
2. Waste Heat Recovery
3. Automatic Temperature Control
4. Boiler and Steam System Improvements

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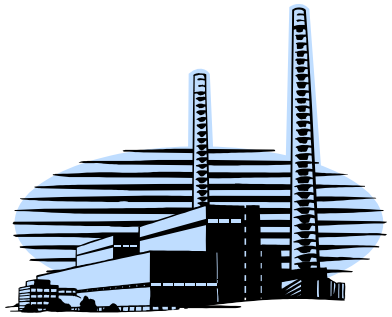
# Oxygen Control for Flue Gas

- Install in-situ O2 sensors in flue gas
- Control flue gas O2 to 2%
- 4% Projected Savings



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# Waste Heat Recovery

- Combustion Air Preheaters
- Water Heating
- Steam Reheating
- Steam Generation
- Absorption Chillers
- 5% Projected Savings

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# Automatic Temperature Control

- Modulate air/fuel to load changes
- Process improvement
- No savings projection provided

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# Boilers and Steam

- Minimize vent steam (2.9%)
- Optimize condensate recovery (2.1%)
- Improve boiler operating practices (1.5%)
- Use high pressure condensate for low pressure steam (1.5%)
- Repair burner / combustion system parts (1.5%)
- Clean boiler heat transfer surfaces (1.4%)
- Repair steam leaks (1.4%)
- Reduce steam operating pressure (1.3%)
- Improve quality of delivered steam (1.0%)
- Isolate steam from unused lines (0.9%)
- Establish correct vent rate for deaerator (0.6%)
- Add / restore boiler refractory insulation (0.6%)

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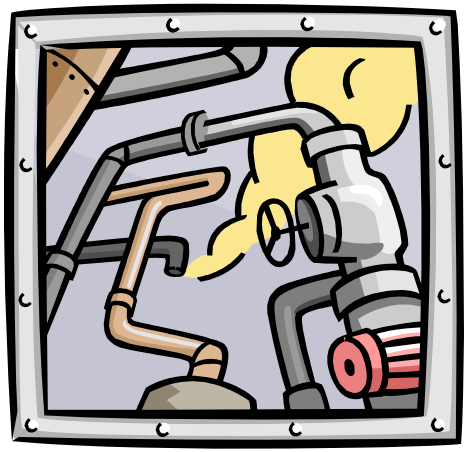
# Boilers and Steam

- Steam generation uses 37% of energy
- 5% Projected Savings



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# Next Steps

1. Optimize current installation
   A. Tuning
   B. Leaks
   C. Maintenance
2. Study feasibility of recommendations
3. Consider plant-wide assessment

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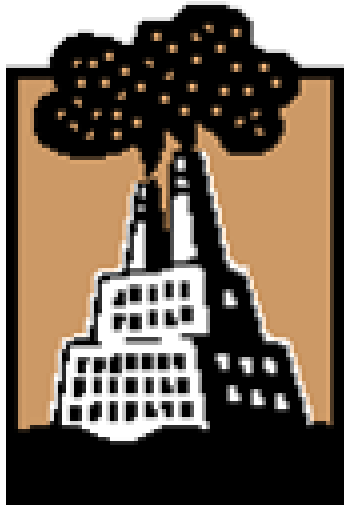
# NOx Considerations

1. Use NOx in prioritization (Fuel = NOx)
2. Take advantage of burner retrofit downtime
3. Seal up heaters for NOx control



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# CTA

- Identify (Where am I?)
- Analyze (What's happening?)
- Optimize (What can I do?)

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